Trichinosis
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Trichinosis

Overview [1,2]

For a more complete description of trichinosis, refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition [3]

Clinical description
A disease caused by ingestion of *Trichinella* larvae. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema.

Laboratory criteria for diagnosis

- Demonstration of *Trichinella* larvae in tissue obtained by muscle biopsy, or
- Positive serologic test for *Trichinella*

Case classification
Confirmed: a clinically compatible case that is laboratory confirmed
Suspect: a report of a clinically compatible case that has not been epidemiologically linked to a confirmed case or has not been laboratory confirmed.

Comment: In an outbreak setting, at least one case must be laboratory confirmed. Associated cases should be reported as confirmed if the patient shared an epidemiologically implicated meal or ate an epidemiologically implicated meat product and has either a positive serologic test for trichinosis or a clinically compatible illness.

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted and what were the results?
When investigating gastrointestinal illness of unknown etiology, see the Outbreak Investigation, Acute Gastroenteritis section of this Manual.
Establish the extent of illness. Determine if household or other close contacts are, or have been, ill by contacting the health care provider, patient, or family member.
Contact the Regional Communicable Disease Coordinator if a case of trichinosis is suspected.

Case/Contact Follow Up And Control Measures

Trichinosis is not transmitted from person to person. *Trichinella spiralis* is transmitted by ingestion of inadequately cooked meat or meat products, especially pork and game.

Determine the source of infection.

- Identify other persons who might have consumed the contaminated food. Follow up with these persons to see if they have been ill. If ill, advise them to seek medical attention and to alert the physician that they may have been exposed to trichinosis.
- If the suspect food is associated with a commercial establishment, embargo all remaining suspect food.
- If the suspect food is intended for home use, advise the case/contact not to eat the food or to cook it thoroughly before consumption by humans or animals.
- Freezing at –13°F for 10 days or irradiation can also be effective in killing the larvae.
- Has the case recently consumed any bear meat or other game?
- Has the case traveled to an endemic area?

Control Measures

See the Control of Communicable Diseases Manual, Trichinellosis (Trichiniasis, Trichinosis), "Methods of control."

See the Red Book, Trichinosis (*Trichinella spiralis*), "Control Measures."

Laboratory Procedures

- Eosinophilia approaching 70%, in conjunction with compatible symptoms or dietary history, suggests the diagnosis.
- Serologic tests are available through the Missouri State Public Health Laboratory (SPHL) from the Centers for Disease Control and Prevention (CDC). Serum antibody titers rarely become positive before the third week of illness. Testing paired acute and convalescent sera is usually diagnostic.
- Larvae in a muscle biopsy can be visualized microscopically, beginning two weeks after infection. The tissue is best examined fresh, compressed between two microscope slides. Identification of larvae in suspect meat can be the most rapid source of diagnostic information. This confirmation test is done by CDC. Prior approval is needed before these specimens are submitted to CDC. Please contact the Regional Communicable Disease Coordinator before shipping these specimens.
- Additional information on laboratory procedures can be obtained from the Regional Communicable Disease Coordinator or from staff at the SPHL. The SPHL telephone number is 573-751-0633 and the web site is: http://www.dhss.state.mo.us/Lab/index.htm. (9 May 2003)

Reporting Requirements

Trichinosis is a Category II reportable disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services within three days of first knowledge or suspicion by telephone, facsimile or rapid communication.

1. For all reported cases, complete a "Disease Case Report" (CD-1), and a "Trichinosis Surveillance Case Report, " CDC 54.7.
2. Entry of the completed CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the Regional Health Office.
3. Send the completed secondary investigation form(s) to the Regional Health Office.
4. All outbreaks or "suspected" outbreaks must be reported as soon as possible (by phone, fax or e-mail) to the Regional Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
5. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the Regional Communicable Disease Coordinator.

References

1. Chin, James, ed. "Trichinellosis (Trichiniasis, Trichinosis)." Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 508-511.
2. American Academy of Pediatrics. "Trichinosis (*Trichinella spiralis*)." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 587-588.
3. Centers for Disease Control and Prevention. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997: 46 (No. RR-10). "Trichinosis (*Trichinella* spp.) (Trichinellosis)," 1996, http://www.cdc.gov/epo/dphsi/casedef/trichinosis_current.htm (9 May 2003)
4. Centers for Disease Control and Prevention. Trichinosis Surveillance, United States, 1987-1990. MMWR 1991:40 (No. SS-3): 35-42.

Other Sources of Information

1. Grove, David I. "Tissue Nematodes (Trichinosis, Dracunculiasis, Filariasis)." Principles and Practice of Infectious Diseases. 5th ed. Eds. Gerald L. Mandell, John E. Bennett, and Raphael Dolin. New York: Churchill Livingstone, 2000: 2943-2945.
2. Bailey TM, Schantz PM. Trends in the incidence and transmission patterns of human trichinosis in the United States, 1982-1986. Rev Infect Dis 1990; Volume 12, pages 5-11.
3. Moorhead A, Grunenwald P, Dietz V, Schantz P. Trichinellosis in the United States, 1991-1996: Declining But Not Gone. Am J Trop Med Hyg, Volume 60(1), 1999, pages 66-69.
4. The Merck Veterinary Manual. 8th Ed. Ed. Susan E. Aiello. Whitehouse Station, NJ: Merck & Co., Inc., 1998: 517, 2176. http://www.merckvetmanual.com/mvm/index.jsp (search "trichinosis" and "trichinella"). (9 May 2003)

Web Resources and Information

1. Centers for Disease Control and Prevention – "Trichinellosis." http://www.cdc.gov/ncidod/dpd/parasites/trichinosis/default.htm (9 May 2003)

Trichinosis
(Trichinellosis)
FACT SHEET

What is trichinosis?
Trichinosis, also called trichinellosis, is caused by eating raw or undercooked pork and wild game products infected with the larvae of a parasite called *Trichinella spiralis*.

What are the symptoms of a trichinosis infection?
During the first week after ingesting infected meat, the patient may experience nausea, diarrhea, vomiting, fatigue, fever, and abdominal discomfort. Two to eight weeks later the following symptoms may be observed: headache, fever, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, diarrhea, or constipation.

For mild to moderate infections, most symptoms subside within a few months. Often, mild cases of trichinosis are never specifically diagnosed and are assumed to be the flu or other common illnesses. In severe infections, patients may experience difficulty coordinating movements, and have heart and breathing problems. Fatigue, weakness, and diarrhea may last for months. In severe cases, death can occur.

Am I at risk for trichinosis?
If you eat raw or undercooked meats, particularly pork, bear, wild feline (such as a cougar), fox, dog, wolf, horse, seal, or walrus, you are at risk for trichinosis. Wild animals are major reservoirs of trichinosis in the United States. The feral (wild) hog population in Missouri may be infected with trichinosis.

Can I spread trichinosis to others?
No. Infection can only occur by eating raw or undercooked meat containing *Trichinella* larvae.

What should I do if I think I have trichinosis?
See your health care provider who can order tests and treat symptoms of trichinosis infection. A blood test or muscle biopsy can show if you have trichinosis. Several safe and effective prescription drugs are available to treat trichinosis. Treatment should begin as soon as possible.

Is trichinosis common in the United States?
Infection was once very common; however, infection is now relatively rare. Cases are now less often associated with pork products and more often associated with eating raw or undercooked wild game meats.

How can I prevent trichinosis?

1. Cook meat and wild game products to an internal temperature of 160 degrees Fahrenheit.
2. Freeze pork at –13 degrees Fahrenheit for 20 days.
3. Freezing wild game meats even for long periods of time may not effectively kill all larvae.
4. Cook all meat fed to pigs or other animals.
5. Clean meat grinders thoroughly between species if you prepare ground meats.
6. Curing (salting), drying, smoking, or microwaving meat does not consistently kill infective larvae.

Missouri Department of Health and Senior Services
Section for Communicable Disease Prevention
Phone: (866) 628-9891 or (573) 751-6113

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
CENTER FOR INFECTIOUS DISEASES
DIVISION OF PARASITIC DISEASES
ATLANTA, GEORGIA 30333

FORM APPROVED
OMB NO. 0920-0009

TRICHINOSIS SURVEILLANCE CASE REPORT

CDC CASE NO. (1-5)

PERSONAL DATA

State Reporting: STATE NO. (6-7)

First Four Letters of Last Name (8-17)

Age: (18-19)

Sex: (20) 1 ☐ Male 2 ☐ Female

Date of Birth: Mo. Day Yr.

County:

Physician's Name

Physician's Address:

DIAGNOSTIC DATA

DATE OF ONSET OF ILLNESS (21-26) Mo. Day Yr.

CDC USE ONLY
INCUBATION PERIOD: (27-28)

OUTCOME: (29) 1 ☐ Recovered 2 ☐ Died 9 ☐ Unknown

Date of Death: Mo. Day Yr.

SIGNS AND SYMPTOMS:

Eosinophilia: (30) (Specify absolute No. or percent): 1 ☐ Yes 2 ☐ No 9 ☐ Unk

Fever: (31) (Specify Temperature): 1 ☐ Yes 2 ☐ No 9 ☐ Unk

Periorbital edema: (32) 1 ☐ Yes 2 ☐ No 9 ☐ Unk

Myalgia: (33) 1 ☐ Yes 2 ☐ No 9 ☐ Unk

MUSCLE BIOPSY: (34)
1 ☐ Positive Findings
2 ☐ Negative Findings
3 ☐ Not Done
9 ☐ Unk

SEROLOGIC FINDINGS: (35)
1 ☐ Positive (specify)
2 ☐ Negative (specify)
3 ☐ Not Done
9 ☐ Unk
Mo. Day Yr.
Test Type / Serum Titer

CDC USE ONLY
Test Type (36)
Test Date (37-42): Mo. Day Yr.

EPIDEMIOLOGIC DATA

SUSPECT FOOD (43)

1 ☐ Pork (Specify type below):
(44) 1 ☐ Wild boar, any cut
2 ☐ Sausage
3 ☐ Chops
4 ☐ Roast
5 ☐ Ham
6 ☐ Bacon
7 ☐ Other pork (Specify): _____
9 ☐ Not specified

2 ☐ Non Pork (Specify type below):
(45) 1 ☐ Bear meat
2 ☐ Other wild animal
3 ☐ Hamburger (ground meat)
8 ☐ Other(specify): _____
9 ☐ Not specified

9 ☐ Unknown

DATE CONSUMED: (46-51) Mo. Day Yr.

LARVAE IN SUSPECT FOOD: (52)
1 ☐ Not Examined 2 ☐ Present
3 ☐ Absent 9 ☐ Unknown

WHERE MEAT OBTAINED: (53)
1 ☐ Supermarket—Grocery Store
2 ☐ Butcher Shop
3 ☐ Restaurant or other public eating establishment
4 ☐ Direct from Farm
5 ☐ Hunted or Trapped
6 ☐ Other (specify): _____
9 ☐ Unknown

PREPARATION AFTER PURCHASE FURTHER PROCESSING: (54)
1 ☐ No further processing
2 ☐ Ground
3 ☐ Smoked
4 ☐ Dried jerky
5 ☐ Marinated
6 ☐ Other(specify): _____
9 ☐ Unknown

METHOD OF COOKING: (55)
1 ☐ Uncooked
2 ☐ Fried
3 ☐ Open-Fire Roasting
4 ☐ Other Cooking Method (specify) _____
9 ☐ Unknown

PATIENT'S OCCUPATION: (56)

RELATED CASES: (57) 1 ☐ Yes 2 ☐ No 9 ☐ Unknown

CDC USE ONLY
MULTIPLE CASE OUTBREAK NO. (58-59)

COMMENTS AND ADDITIONAL DATA

Investigator:

Title:

CDC 54.7 REV. 02-90
(Formerly 4.239)

TRICHINOSIS

Trichinosis is a parasitic infection of man and animals caused by the nematode *Trichinella spiralis*. The usual mode of infection in man is by ingestion of infected pork products which have been inadequately cooked or treated. The clinical and pathological features of the disease are caused by larvae penetrating the walls of the gastrointestinal tract and invading the skeletal muscles and occasionally the heart and central nervous system.

Clincial Features

Gastrointestinal symptoms including diarrhea, nausea and vomiting may occur within 24 hours after ingestion of infected meat, particularly if the meat contains large numbers of larvae. With infections of lesser intensity gastrointestinal symptoms may be very mild or absent.

The second or migratory phase of the infection usually occurs within one to two weeks of exposure. This phase is characterized by myalgia, edema, particularly periorbital edema, fever, cough and malaise. In addition, larvae may be deposited in the central nervous system producing diffuse of focal neurologic signs, or in the myocardium producing tachycardia and electrocardiographic changes.

Epidemiology

The reservoirs of the parasite in the United States include swine and other domestic animals such as dogs and cats. In addition and contributing to the perpetuation of domestic animal reservoirs, is the presence of the parasite in a variety of wild animals including the rat, fox, wolf, bear and seal. Man is infected by eating inadequately cooked infected food. The practice of feeding improperly treated garbage to swine is largely responsible for the persistence of the infection in this host. Since pork is not inspected for trichina larvae in the United States, there is a risk of acquiring the disease on ingestion of improperly prepared pork or pork products.

Laboratory

1. Eosinophilia – Usually pronounced.
2. Serologic tests – several tests are presently available for the diagnosis of trichinosis. They include complement-fixation test and others such as rapid slide flocculation procedures (bentonite, latex and Suessenguth-Kline). Titers usually rise between the third and sixth week after infection.
3. Muscle biopsy – presence of non-calcified larvae of *T. spiralis* provides diagnostic confirmation of recent infection.
4. Larvae in suspected foods – identification of viable larvae in suspected foods is evidence of exposure in a case or outbreak of trichinosis.